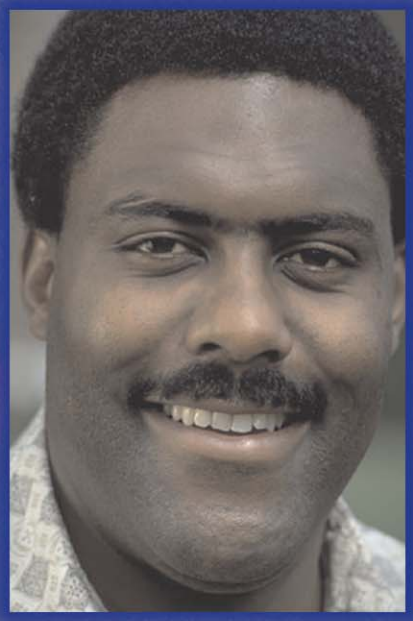

Missouri Diabetes Burden Report and 2002-2007 State Plan

Preface

Dear Colleague:

Diabetes, a growing epidemic, is a major public health problem. Left untreated, diabetes can lead to serious medical complications including heart disease, amputation, stroke, kidney failure and blindness. With approximately 270,000 Missourians reporting diabetes in 2000 and with related costs exceeding $2 billion, diabetes is an increasingly prevalent chronic disease deserving of a well-organized, structured and comprehensive action plan.

Therefore, it is with great pleasure that I present the "Missouri Diabetes Burden Report and State Plan, 2002-2007." This report provides important information, including incidence and prevalence data, disease management methods, and community strategies for improving the lives of those diagnosed with diabetes in Missouri. In addition, the plan provides strategies for reducing the prevalence of this disease among those who exhibit risk factors but have not yet developed diabetes.

Significant progress has been made in combating diabetes in Missouri, but tremendous work remains. For example, in 2000 only 1 in 2 Missourians with diabetes checked their blood glucose level less than daily, while more than one-third have not had their feet examined by a health professional in the past year.

Perhaps more troubling, approximately 2 million adults currently without physician diagnosed diabetes in our state have one or more of the risk factors associated with the development of diabetes, such as obesity. In Missouri, the percentage of obese citizens has nearly doubled during the past ten years.

Reaching out to those already diagnosed with diabetes, as well as targeting communication campaigns designed to inform other Missourians of the risk factors associated with developing the disease is crucial. Stressing the seriousness of diabetes in Missouri and its association with other chronic disease must be made a priority.

The Missouri Diabetes Control Program and its partners are diligently working to reduce the burden of diabetes in our state. I hope that together we can create a healthier Missouri for ourselves, our children, and our future generations.

Sincerely,

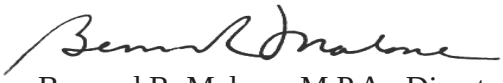

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Table of Contents

Executive Summary

Executive Summary

Paramount to any public health strategy is the ambition to reduce the burden of illness or disease through a multifaceted approach that combines elements of education, prevention, treatment and collaboration. Such is the case with the Missouri Diabetes Control Program (MDCP), a program of the Missouri Department of Health and Senior Services' Bureau of Chronic Disease Control (BCDC).

Affecting approximately 1 in every 15 Missouri adults, diabetes makes a significant social and economic impact on the state's residents. Diabetes is estimated to cost our nation as much as $98 billion dollars each year. In addition to the economic impact of this disease, in 1999 diabetes was the primary or contributing cause of 121,280 Missouri hospitalizations and 4,691 Missouri deaths.

Because diabetes makes such a significant impact in our state, the MDCP works to lessen the burden of this disease. In conjunction with other health programs within the BCDC, MDCP provides and promotes information, education, policies, and programs aimed at reducing the impact of diabetes on Missourians. Additionally, the MDCP has implemented goals related to evidence-based diabetes recommendations, such as Healthy People 2010 and the Centers for Disease Control and Prevention's (CDC's) National Diabetes Objectives. Ultimately, the MDCP strives to increase the number of Missouri diabetes patients receiving the recommended standards of care (such as annual eye and foot exams, immunizations, and counseling) while helping others identify and/or prevent the onset of diabetes.

The purpose of the *Missouri Diabetes Burden Report and State Plan* is to provide a framework to guide diabetes prevention and control efforts in Missouri; a "blueprint" of sorts for MDCP and its partners. Ideally, this plan will serve as a foundation to unify the efforts of all Missouri organizations involved in diabetes care and/or prevention, while offering to help meet the needs of local diabetes programs.

Diabetes impacts all Missouri socio-demographic groups, but affects some segments of our society more than others. For example, the elderly and African Americans had the highest prevalences of diabetes in 2000. Therefore, the MDCP continues to diligently work to eliminate such disparities between different Missouri populations. While educating all Missourians, and paying special attention to high-risk populations, the MDCP will work with the residents of Missouri to decrease the impact of diabetes in our state.

Diabetes: The Disease

What is diabetes?

Most of the food consumed by humans is converted to glucose, which is used by the body for energy. The pancreas, an organ that lies near the stomach, produces a hormone called insulin that enables the glucose to enter the cells of the body. When a person has diabetes the body either does not produce enough insulin or cannot effectively use the insulin it produces. This causes glucose to build up in the blood. If uncontrolled, diabetes can cause serious health complications including heart disease, kidney failure, blindness, and diabetic nerve disease which can lead to amputation of the lower extremities.[1]
There are three major types of diabetes:

Type 1 Diabetes

This type of diabetes was previously called insulin-dependent or juvenile onset diabetes. This typically occurs in persons younger than 30 years of age and accounts for 5% to 10% of all diagnosed cases of diabetes. Genetic, environmental, and autoimmune factors that inhibit the insulin-producing capacity of the pancreas are believed to be involved in the development of this type of diabetes. A person with Type 1 diabetes requires insulin injections to stay alive. Unlike Type 2 diabetes, a person would suffer potential death and severe complications if insulin were withdrawn.

Type 2 Diabetes

This type of diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. This typically occurs in persons older than 30 years of age and accounts for about 90% to 95% of all diagnosed cases of diabetes. Risk factors for Type 2 diabetes include older age, obesity, lack of physical activity, family history of diabetes, and race/ethnicity. Persons of African American, Hispanic/Latino, and Native American ancestry and some Asian American and Pacific Islander groups are at particularly high risk for Type 2 diabetes. Additionally, the increase in obesity and sedentary lifestyle in our state and country has been accompanied by an increase in Type 2 daibetes among children and adolescents.

Gestational Diabetes

Gestational diabetes develops in 2% to 5% of all pregnancies. It is usually temporary, disappearing when the pregnancy is over. However, it is believed to increase the risk of developing Type 2 diabetes in the future. Gestational diabetes occurs more frequently among African Americans, Hispanic/Latinos, and Native Americans, as well as those who are obese or who have a family history of diabetes.[1]

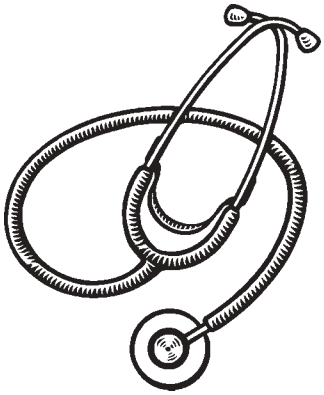
Symptoms of Diabetes

Some of the symptoms of diabetes are:

- frequent urination,
- excessive thirst,
- unexplained weight loss,
- sudden vision changes,
- numbness or tingling in hands or feet,
- tiredness or exhaustion,
- sores that are slow to heal, and
- more infections than usual.

People with diabetes might have some or none of the above symptoms. If they think they might have diabetes they must consult a physician or healthcare professional for the proper diagnosis.

Diagnostic Criteria for Diabetes



- The routine test for diabetes is a fasting (i.e., no food for at least 8 hours prior to test) blood glucose test. A confirmed fasting blood glucose value of greater than or equal to 126 milligrams/deciliter (mg/dL) on two separate occasions indicates a diagnosis of diabetes.

- In the presence of symptoms of diabetes, a random (non-fasting) blood glucose value of greater than or equal to 200 mg/dL indicates a diagnosis for diabetes. This value must occur on a subsequent day for a confirmed diagnosis.

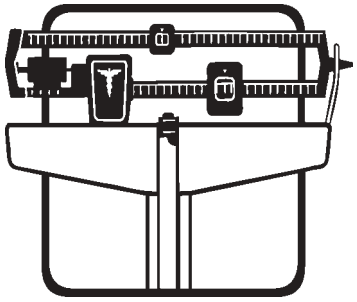
- An Oral Glucose Tolerance Test (OGTT) is another test to diagnose diabetes. A two hour plasma glucose value of greater than or equal to 200mg/dl indicates a diagnosis of diabetes. [2]

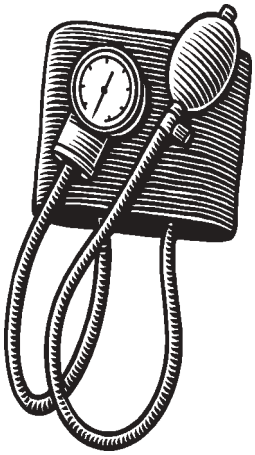
Diabetes Risk Factors

The risk factors for developing diabetes can be classified as behavioral, modifiable and non-modifiable characteristics. These risk factors include:

Behavioral Characteristics

- Physical activity
- Poor nutritional habits





Modifiable Characteristics

- Obesity
- High blood pressure/hypertension
- High blood glucose

Non-Modifiable Characteristics

- Family history
- Age
- Race/ethnicity

The behavioral and modifiable characteristics listed above are risk factors that can be changed through lifestyle modifications. On the other hand, there is nothing a person can do to change their family history, age, or race.

PHYSICAL INACTIVITY

Regular physical activity decreases the risk of diabetes and other chronic conditions. A moderate amount of physical activity such as 30 minutes of brisk walking five times a week or more has shown to have significant health benefits. In spite of these benefits, there is an increasing trend of leading a sedentary life.[3] Almost 29% of Missouri's adults do not get any leisure-time physical activity, while almost 38% of adults with diabetes are physically inactive.

POOR NUTRITIONAL HABITS

A nutritious diet that is low in saturated fats and includes five or more servings of fruits and vegetables a day is very important for maintaining good health. Despite this, less than 25% of adults in the United States eat the recommended servings of fruits and vegetables each day.[5] In Missouri only 20% of adults eat the recommended amount of fruits and vegetables each day.[3]

OBESITY

In the United States, overweight and obesity are now epidemic, affecting children at younger ages and a greater proportion of the general population.[1] In all states, in both sexes, and across age groups and race, there has been a steady increase in obesity (i.e., BMI >30) from 1991 (12) to 1998 (17.9). In Missouri, from 1990 to 2000, the prevalence of obesity nearly doubled from 11.9% to 22.1%. The greatest increases occurred among 18-29 year olds and Hispanic/Latino populations. While there is a strong correlation between obesity and the onset of Type 2 diabetes, there is substantial delay between these two conditions. Since obesity has dramatically increased over the past decade, we can expect the future prevalence of diabetes to increase.

Complications of Diabetes

Uncontrolled diabetes can lead to a number of serious complications. Maintaining blood glucose levels at normal or near normal levels (i.e., controlling one's diabetes) significantly reduces the risk of diabetes-related complications. A hemoglobin A_1c test accurately reflects the degree of glucose control over the past 2-3 months.

American Diabetes Association (ADA) Recommendation: *A_1c testing should be performed routinely in all patients with diabetes, approximately every 3 months, so departures from the target range can be addressed in a timely fashion.*[2]

Serious complications include:

HEART DISEASE

Heart disease is the leading cause of diabetes-related deaths. Adults with diabetes are 2 to 4 times more likely to die from heart disease than adults without diabetes.[4]

*It is estimated that 30-70% of endstage renal disease cases could be avoided, preventing at least **10,000** cases of diabetes-related kidney failure each year.*

HIGH BLOOD PRESSURE AND STROKE

An estimated 60% to 65% of people with diabetes have high blood pressure and are 2 to 4 times more likely to suffer a stroke compared to people without diabetes.[4]

END STAGE RENAL DISEASE

Diabetes is the leading cause of kidney failure, affecting about 33,000 new individuals each year. It is estimated that 30-70% of cases could be avoided, preventing at least 10,000 cases of diabetes-related kidney failure each year.[4]

DIABETIC RETINOPATHY

Diabetes is the leading cause of blindness in adults 20 to 74 years old resulting in 12,000 to 24,000 new cases of blindness each year due to diabetic retinopathy.[4]

ADA Recommendation: *Comprehensive dilated eye and visual examinations should be performed annually by an ophthalmologist or optometrist on all patients age 10 and older who have had diabetes for 3-5 years, all patients diagnosed with diabetes after age 30, and any patient with visual symptoms and/or abnormalities.*[2]

More than half of lower limb amputations in the United States occur among people with diabetes.

AMPUTATION

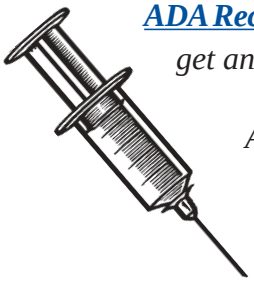
About 60% to 70% of people with diabetes have mild to severe forms of nervous system damage, including impaired sensation or pain in the feet or hands. Severe forms of diabetic nerve disease are a major contributing cause of lower extremity amputation.[4]

ADA Recommendation: *All individuals with diabetes should receive a thorough foot examination at least once a year to identify high-risk foot conditions.*[2]

COMPLICATIONS FROM INFLUENZA & PNEUMONIA

People with diabetes have a compromised immune system, making them more susceptible to severe cases or complications from influenza or pneumonia. Immunization against influenza and pneumonia is an important part of preventative services as persons with diabetes are 2 to 4 times more likely to die from complications related to these conditions.[4]

People with diabetes have a compromised immune system, making them more susceptible to severe cases or complications from influenza or pneumonia.



ADA Recommendation: *Anyone diagnosed with diabetes should get an annual flu shot as a preventive measure.*

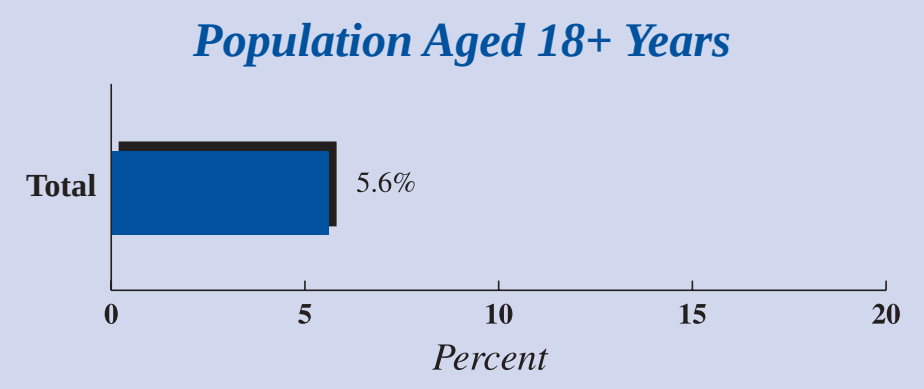
At least one life-time pneumonia immunization is recommended. Revaccination is recommended for persons over 65 years of age if the original immunization was given 5 or more years prior.[2]

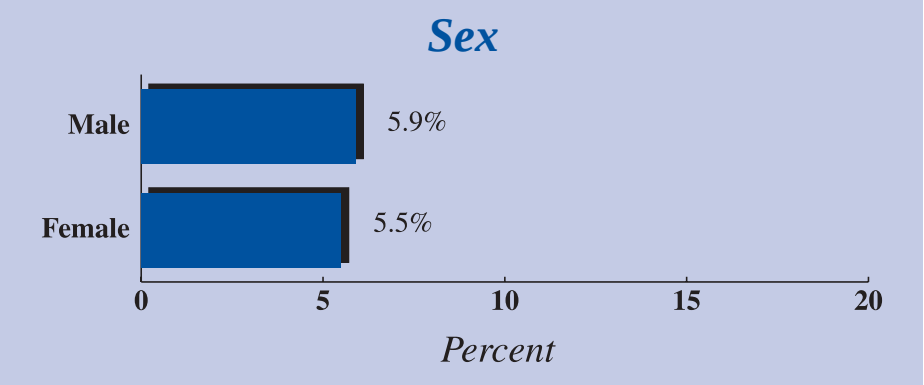
Diabetes: United States

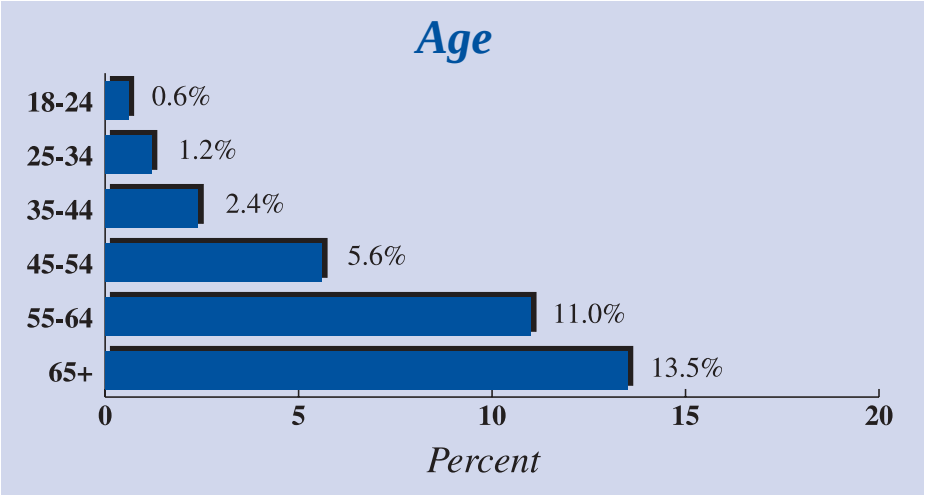
The Burden of Diabetes Nationally

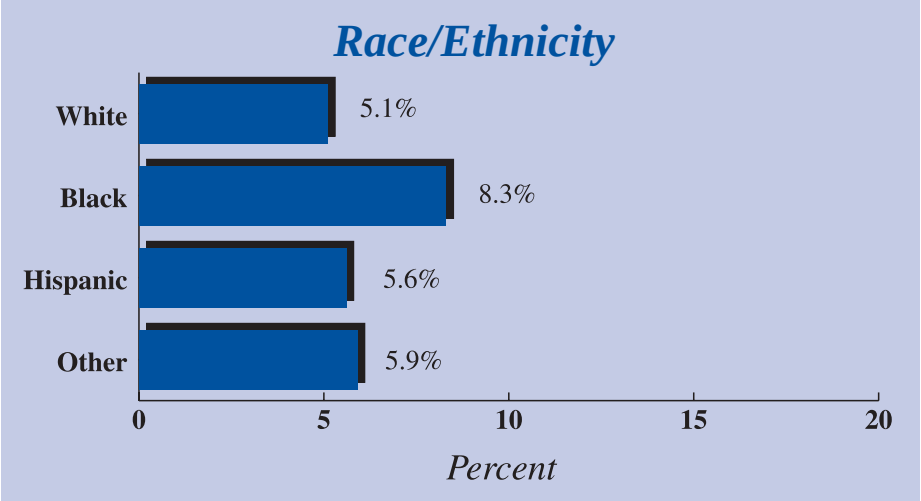
From 1990 to 2000, the prevalence of diabetes increased by 49% nationally. The American Diabetes Association (ADA) projects a 165% increase in the prevalence of diabetes by the year 2050. In 1999, an estimated 11,711,173 adults in the United States or 5.6% of the national population aged 18 years or older, reported physician-diagnosed diabetes (Figure 1).[5] Individuals aged 55 or older and African Americans had the highest prevalences of physician-diagnosed diabetes.

Figure 1. The 1999 Prevalance of Self-Reported, Physcian-Diagnosed Diabetes Among Americans Aged 18+ Years: Overall and Within Sex, Age and Race/Ethnic Groups









Nationally, approximately 55% of individuals with diabetes checked their blood glucose level less than daily, 45% have not had a foot exam in the past year, and 40% have not had a dilated eye exam in the past year.[6] Additionally, 19% of adults in managed care organizations have not had their A_1c checked in the past year.[7]

In 1996, diabetes contributed to 193,140 deaths in the United States.[4] Additionally, people with diabetes suffer from many diabetes-related complications. Approximately 31,650 new cases of end-stage renal disease, 12,000-24,000 new cases of blindness, 86,000 lower-extremity amputations, and 1.4 million hospitalizations due to cardiovascular disease occur among individuals with diabetes each year.[1] Using 2000 census data, the estimated direct cost (medical care) was approximately $44 billion and the indirect cost (disability, work loss, and premature mortality) was approximately $54 billion. Combined, the total cost of diabetes nationally was $98 billion in 1997.[8]

According to the Centers for Disease Control and Prevention (CDC), with the proper patient education, care, and support; up to 90% of diabetes related blindness could be prevented, diabetes related kidney failure could be reduced by 50%, and up to 50% of lower limb amputations could be avoided.

Diabetes: Missouri

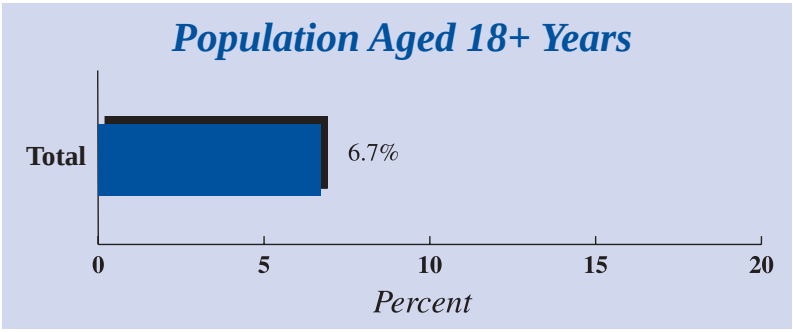
The Burden of Diabetes in Missouri

Diabetes is a COMMON disease in Missouri

In 2000, approximately 1 in every 15 adults of the population aged 18 years or older reported physician-diagnosed diabetes. This translates into 273,290 Missouri adults, or 6.7% of the adult population (Figure 2).[9] Additionally, an estimated 113,500 individuals of all ages remain undiagnosed.[8]

Individuals aged 65 or older and African Americans had the highest prevalences of physician-diagnosed diabetes. Individuals with an annual household income of less than $20,000 have a higher prevalence of physician-diagnosed diabetes (10.8%) than individuals with annual household incomes of greater than $20,000 (5.1%).[9]

Figure 2. The 2000 Prevelance of Self-Reported, Physician-Diagnosed Diabetes Among Missourians Aged 18+ Years: Overall and Within Sex, Age and Race/Ethnic Groups



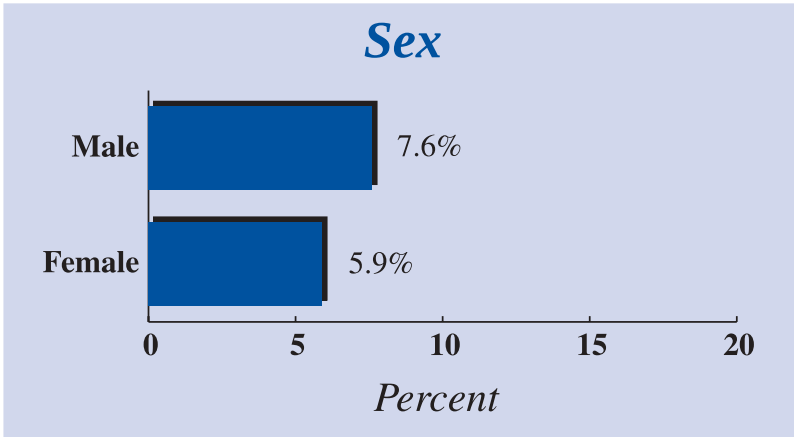
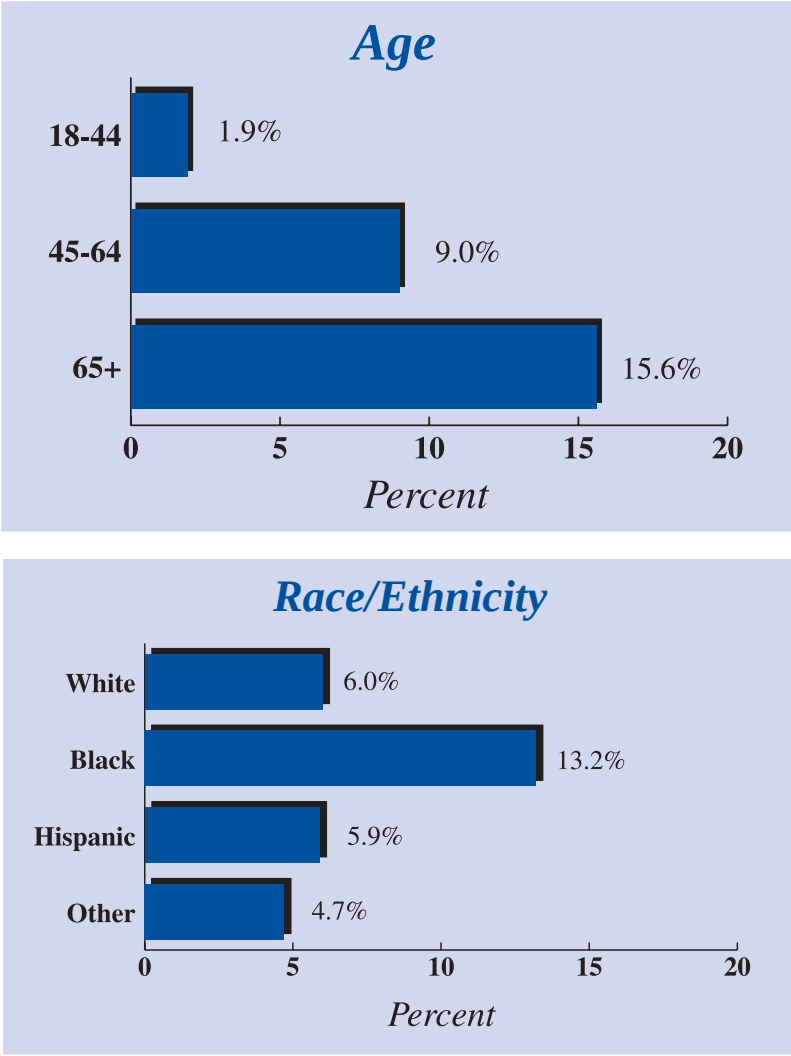


Figure 2 (continued). The 2000 Prevelance of Self-Reported, Physician-Diagnosed Diabetes Among Missourians Aged 18+ Years: Overall and Within Sex, Age and Race/Ethnic Groups



Of the estimated 273,290 Missouri adults with physician-diagnosed diabetes:

- 48.7% (approximately 132,235 individuals) checked their blood glucose level less than daily,[9]
- 13.1% (approximately 31,387 individuals) have not had their A_1c checked by a health professional in the past year,[9]
- 36.9% (approximately 95,290 individuals) have not had their feet checked by a health professional in the past year,[9]
- 32.0% (approximately 86,475 individuals) have not had a dilated eye exam in the past year,[9] and
- 56.4% (approximately 153,529 individuals) have never taken a course in diabetes self-management.[9]

An estimated 51.8% (approximately 1,947,727 individuals) of the undiagnosed adult population without diabetes in Missouri has one or more of the risk factors associated with the development of diabetes. These risk factors are older age (i.e., 65 years or older), obesity (i.e., a Body Mass Index of 30.0 or greater), or leisure-time physical inactivity (i.e., no exercise in the past month).[9]

Diabetes, Health Care Access, and Risk Factors among African Americans.

A 1996 study conducted in sections of St. Louis, Kansas City and the Bootheel found that the prevalence of physician-diagnosed diabetes among adult African Americans (11.2%) was twice that among whites/others (5.1%).[10] Additionally, African Americans were more likely to have no form of insurance (22.7%), to cite cost as a barrier to visiting the doctor in the past year (15.7%), to be overweight (50.8%), to have not exercised in the past month (29.0%), to currently smoke (29.6%), to have been told by a health professional they had high blood pressure (34.4%), and more likely to not have had their blood cholesterol level checked (37.5%) than whites/others (12.3%, 10.7%, 41.3%, 19.7%, 26.8%, 24.5%, and 25.7%, respectively).

Diabetes is a SERIOUS disease in Missouri

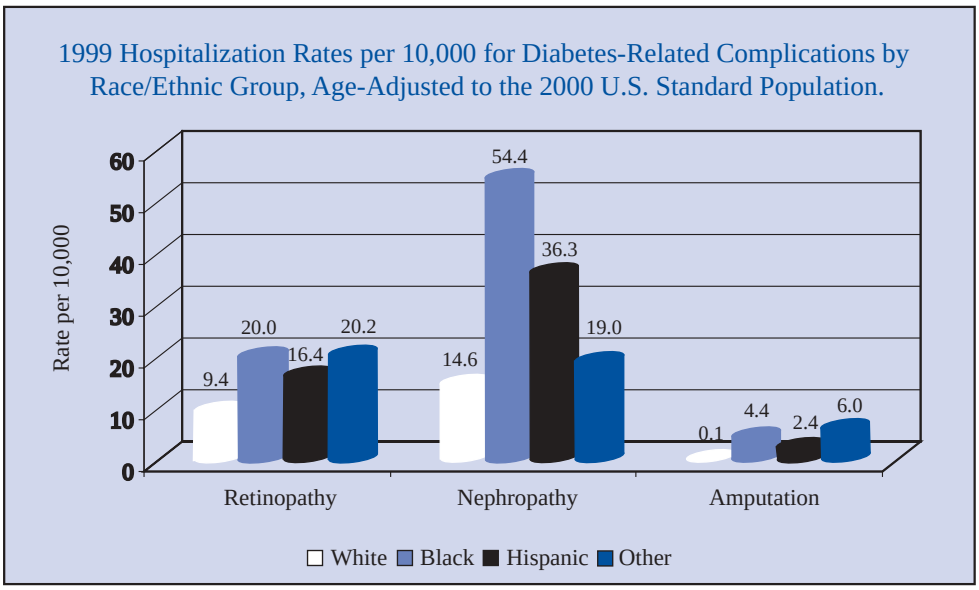
People with diabetes suffer from many diabetes-related complications or conditions. In 1999, there were 121,280 diabetes-related hospitalizations (i.e., hospitalizations with any diagnosis of diabetes mellitus, International Classification of Diseases, 9th Revision {ICD-9}, diagnosis code 250) in Missouri.[11] This includes:

- 9,468 hospitalizations (or 18.4 per 10,000) with any diagnosis of diabetes with renal manifestations (ICD-9 diagnosis code 250.4), [11]
- 5,315 hospitalizations (or 10.5 per 10,000) with any diagnosis of diabetes with ophthalmic manifestations (ICD-9 diagnosis code 250.5), [11]
- 1,868 hospitalizations (or 1.7 per 10,000) for diabetes-related amputations (diabetes {ICD-9 diagnosis code 250} in conjunction with an amputation {ICD-9 procedure code 84.1}),[11] and
- of the 121,280 diabetes-related hospitalizations, 99,792 (or 82.3%) also listed disease(s) of the heart (ICD-9 diagnosis codes 390 through 448) as an additional diagnosis.[11]

Of the 1999 hospitalizations with diabetes listed as the primary diagnosis, an estimated 4,041 were preventable.[12] African Americans had higher estimated rates of hospitalization due to diabetes and related complications than whites (Figures 3 and 4), while Hispanic/Latinos had higher estimated rates of hospitalization due to diabetes-related complications compared than whites (Figure 3).[11] Among individuals with diabetes, those aged 65 years or older have higher rates of diabetes-related hospitalization and complications than those aged less than 65 years (Data not Shown).[11]

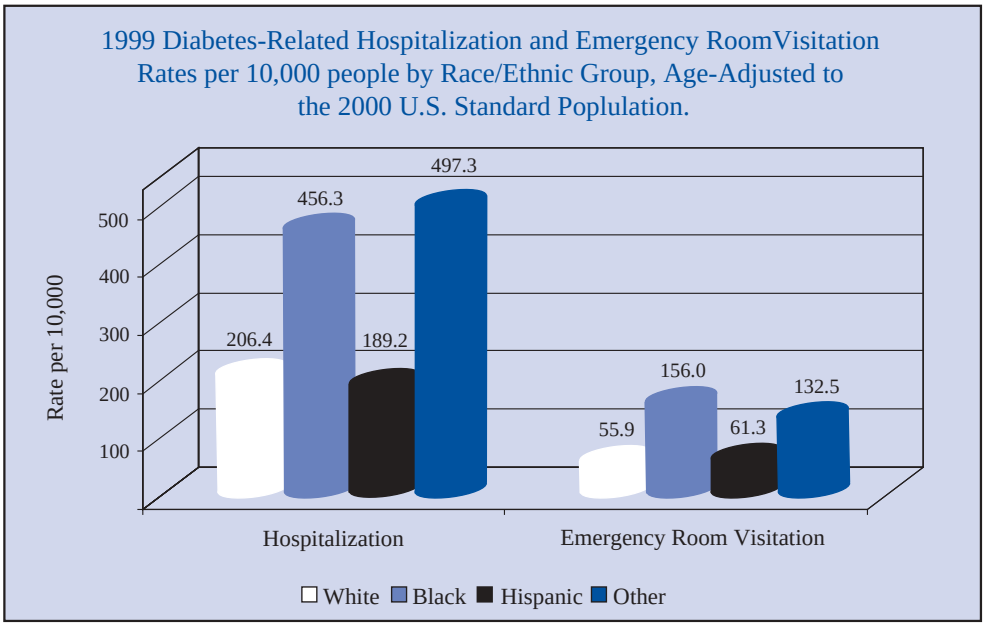
In 1999, there were 63,127 diabetes-related (i.e., any diagnosis of diabetes mellitus) outpatient encounters in Missouri, of which 32,967 (or 52%) were emergency room visits.[11] African Americans had a higher estimated rate of diabetes-related emergency room utilization than whites (Figure 4).[11] Among individuals with diabetes, those aged 65 years or older had a higher rate of diabetes-related outpatient encounters than those aged less than 65 years (Data not shown).[11]

Figure 3.



NOTE: Due to small sample size the estimated hospitalization rates for Hispanic/Latinos and Others may not be reliable.

Figure 4.



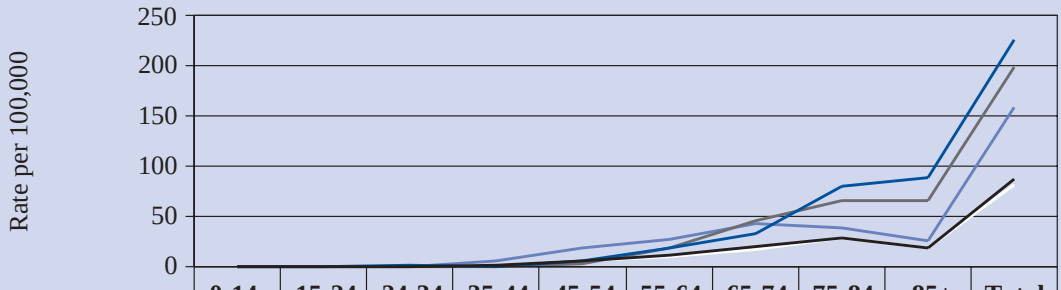
NOTE: Due to small sample size the estimated emergency room utilization rates for Hispanic/Latinos and Others may not be reliable.

Diabetes is a DEADLY disease in Missouri

Diabetes was the 8th leading cause of death from 1988 to 1998.[12] In 1999, diabetes was the underlying or a contributing cause of death for 4,691 Missourians, for an age-adjusted rate of 87.2 deaths per 100,000 people (Figure 5).[13] Diabetes mortality, which increases with age, was higher among African Americans than whites.

Figure 5.

1999 Diabetes Mortality Rates per 100,000 by Race/Ethnic and Age Group, Age-Adjusted to the 2000 U.S. Standard Population.



	0-14	15-24	24-34	35-44	45-54	55-64	65-74	75-84	85+	Total
White	0.0	0.1	0.3	1.6	5.3	9.9	17.6	28.6	18.1	81.3
Black	0.1	0.2	0.0	5.0	17.9	27.6	42.5	39.2	26.0	158.5
Hispanic	0.0	0.0	0.0	0.0	2.7	17.9	45.9	66.2	66.4	199.0
Other	0.0	0.0	0.8	0.0	5.1	19.1	33.1	79.4	88.0	225.5
Total	0.0	0.1	0.2	1.9	6.4	11.3	19.4	29.2	18.6	87.2

NOTE: Due to small sample size the estimated mortality rates for Hispanics and Others may not be reliable.

Diabetes is a COSTLY disease in Missouri

Using 2000 census data, the estimated direct cost (medical care) was approximately 925 million dollars and the indirect cost (lost productivity and premature mortality) was approximately 1.15 billion dollars.[8] Combined, the total cost of diabetes in Missouri exceeded 2 billion dollars in 2000.

The Missouri Diabetes Control Program

Background

The Missouri Diabetes Control Program (MDCP) originally received funding in 1981 from the Center for Disease Control and Prevention (CDC). The goals of the program are to provide and promote education, policies and programs to health professionals and community-based organizations that reduce the impact of diabetes. Program goals are in accordance with goals of Healthy People's 2010 and CDC's National Diabetes Objectives of increasing the number of persons with diabetes who receive the recommended standards of care for A_1c testing, annual eye and foot exams, flu and pneumonia immunization, diabetes self-management and education counseling. The MDCP also aims to demonstrate success in reducing health disparities for high-risk populations with respect to diabetes prevention and control and in the development of programs for promotion of wellness, nutrition and physical activity, weight and blood pressure control and smoking cessation. Program aims also support the goal of the Missouri Department of Health and Senior Services to reduce the burden of chronic disease.

As Missouri receives only limited funding from CDC, program efforts have been targeted at achieving the CDC National Diabetes Objectives, primarily in those areas of the state disproportionately affected by diabetes and with populations at greatest risk for diabetes. These are the adult minority populations of Kansas City, St. Louis, and the Bootheel. Most activities have been focused toward the control of diabetes and the prevention of diabetes-related complications. Awareness activities in communities have focused on risk factors for the development of diabetes, as well as on secondary prevention.

This plan develops strategies that expand efforts toward a statewide approach. Given emerging research that Type 2 diabetes may be prevented through a healthy lifestyle, this plan incorporates primary prevention strategies. The achievement of the expanded statewide focus and primary prevention strategies are contingent upon enhancement of the MDCP infrastructure and activities through additional funding.

Missouri Diabetes Control Program Advisory Board

The Missouri Diabetes Control Program Advisory Board's purpose is to advise, guide, and support the MDCP so that it can achieve its goals and to provide a forum that facilitates the coordination of the activities and efforts of the various groups, agencies, and persons with an active interest in diabetes and diabetes care within Missouri. The advisory board is comprised of persons with or family members of persons with diabetes, health care providers, and organizations that provide care, education, support and advocacy for persons with diabetes (such as the American Diabetes Association and Juvenile Diabetes Research Foundation International).

Programs

The MDCP accomplishes its program aims through partnerships with a variety of state, local, and national organizations to implement quality improvement, awareness, and educational programs, and to provide training and resources to health professionals at all levels.

The MDCP has partnered with the Health Services and Resources Administration's (HRSA) Bureau of Primary Health Care, the Institute for Healthcare Improvement, and CDC's Division of Diabetes Translation since January 1999 to improve diabetes care within federally qualified health centers through the ***Diabetes Collaborative*** of the National Health Disparities Collaboratives. Improvement in care is accomplished by improving health care delivery systems, increaseing patient access, and decreasing health disparities among medically underserved populations. An electronic diabetes registry has been established in all centers to track care provided and patient outcomes and provide information through evidence based improvement efforts.

Through ***Diabetes Today,*** the MDCP trains local community leaders and concerned citizens to form coalitions that identify needs and resources for individuals with diabetes and their family members. Coalitions are assisted in planning, implementing, and evaluating community-level programs to prevent and control diabetes and its complications.

Professional Education initiatives are coordinated with a variety of professional and educational organizations to assure that providers and other health professionals are knowledgeable of the latest standards of care for diabetes.

Increased awareness of diabetes is furthered by partnerships with multiple agencies that promote early diagnosis, improve treatment for people with diabetes, and ultimately prevent the onset of diabetes-related complications. MDCP collaborates on awareness campaigns around the warning signs and risk factors, self-management behaviors among persons with diabetes, and coverage for diabetes care.

Missouri Diabetes State Plan

Missouri Diabetes State Plan: Purpose

The purpose of the Missouri Diabetes State Plan is to provide a framework to guide future diabetes prevention and control efforts of the MDCP. This plan is intended to serve as a blueprint for the achievement of goals and objectives determined by the MDCP and the CDC's National Diabetes Objectives. The plan is also intended to unify the efforts of organizations that are involved in diabetes care throughout the state in meeting the needs of the individuals they serve.

Initiatives are targeted at reducing health disparities among high-risk populations, specifically racial/ethnic groups, the elderly, and the economically disadvantaged. In Missouri, minority adults (including African Americans, Hispanic/Latinos, and other race/ethnic groups) have almost twice the prevalence of physician-diagnosed diabetes of non-Hispanic whites.[9] Additionally, minority groups generally have higher rates of diabetes-related complications, hospitalization, emergency room utilization, and mortality than non-Hispanic whites.[11] Among individuals with diabetes, those aged 65 years or older have a higher prevalence of physician-diagnosed diabetes and higher rates of diabetes-related complications, hospitalization, outpatient encounters, and mortality than those aged less than 65 years.[9,11] Individuals with an annual household income of less than $20,000 have a higher prevalence of physician-diagnosed diabetes (10.8%) than individuals with annual household incomes of greater than or equal to $20,000 (5.1%).[9]

This is a planning document that will enable the following target audiences to address issues related to diabetes.

- Policy makers/payers: To understand the impact diabetes has on Missouri residents and to promote self-management, resources, access to healthcare, and funding for the prevention, early detection, and treatment of diabetes.

- Healthcare professionals: To ensure that healthcare professionals are aware of and provided with the latest clinical standards of care for the prevention and treatment of diabetes.

- Diabetes partners: To encourage coordinated planning among institutions and organizations providing diabetes-related activities that address the National Diabetes Objectives and objectives of Healthy People 2010.

SETTINGS:

The initiatives proposed in the Missouri Diabetes State Plan will be implemented in the following settings:

Health Systems

These are the major settings in which diabetes care is delivered and reimbursed throughout Missouri. Health systems include:

Healthcare Professionals: These include primary care physicians, specialists, family nurse practitioners, nurses, diabetes educators, nutritionists, pharmacists, etc.;

Facilities that deliver healthcare: These include all settings where healthcare is provided, such as hospitals, health centers (including federally qualified health centers and free health clinics that provide care to underserved populations including minority and low income populations), and physicians' offices; and

Payers of healthcare: These include employers, Medicare, Medicaid and commercial managed care plans.

Communities

A community may be defined as a group of people living within a particular area. It may be comprised of people of different sexes, ages, race/ethnic origins, faith, and socio-economic standing. Community based programs provide an opportunity to mobilize residents to improve access to resources beyond individual agencies and reach a large number of people, particularly the underserved population. Community efforts will be implemented at faith-based communities and organizations, worksites, and schools.

By utilizing a variety of effective health communication strategies, the MDCP and its partners will increase awareness and knowledge among the target audiences across the various settings.

EVALUATION

A comprehensive evaluation of efforts will assess the effectiveness of strategies and activities, appropriate use of funding, and provide ongoing feedback for program improvement. The Bureau of Chronic Disease Control's Research Analyst will conduct evaluation throughout the project period, with technical support and oversight from the Division of Chronic Disease Prevention and Health Promotion's Consultant Epidemiologist. Summaries of data and findings from all levels of evaluation will be reported through health communications materials and presentations during meetings to program partners.

PROCESS EVALUATION

Process evaluation monitors the accomplishment of specific program strategies and activities. Without appropriate process evaluation it would be impossible to distinguish problems between the program design and the way it was administered. Process evaluation indicators include:

- establishment of the Diabetes Network sites;
- contacts with community groups, number and type of contacts;
- contact with healthcare providers/organizations, number and type of contacts; and
- monitoring health communications, promotion and outreach activities.

IMPACT EVALUATION

Impact evaluation continuously monitors the results of program activities. Impact evaluation indicators include:

- community developed initiatives, programs, educational opportunities and number of people reached;
- provider based initiatives, programs, educational opportunities and number of people reached;
- prevalence of physical activity, fruit and vegetable consumption, obesity, high blood pressure and smoking;
- percentage of people who receive the recommended foot exam, eye exam, A_1c test, flu and pneumonia vaccinations; and
- number of professional education programs offered each year.

OUTCOME EVALUATION

Outcome evaluation assesses the effect of the overall program. Data sources that will be used to assess statewide burden of diabetes and related complications are BRFSS, hospitalization and emergency room records, and death certificates. Outcome evaluation indicators include:

- prevalence of diabetes
- rate of diabetes related complications
- rate of diabetes related hospitalization
- rate of diabetes related mortality

Objective 1:

By 2007, establish a Diabetes Network through a formal partnership with at least one American Diabetes Association's Recognized Diabetes Education Program in each of seven regions throughout the state for the purposes of

- **delivery of diabetes education to patients, family and the public,**
- **delivery of continuing education to various health professionals, particularly for non-diabetes specialists who treat patients with diabetes, and**
- **facilitation of improved patient care and other diabetes control and prevention activities aimed at benefiting the communities in each region.**

Strategies

Identify the distribution of existing Recognized Diabetes Education Programs and identify any unrepresented or underrepresented areas without recognized programs.

Develop and implement selection process in at least three regions by 2005, two additional regions by 2006, and two additional regions by 2007.

Rationale

Missouri has been successful in utilizing seven Regional Arthritis Centers to provide education and programs for patients, families, and the public, as well as offering continuing education for various health professionals. The Regional Arthritis Centers also have facilitated improved patient care and other arthritis control activities aimed at benefiting communities served by each center. Given the urban/rural composition of Missouri, a similar regional approach ensures that services and programs are accessible across the state and provides a delivery mechanism for diabetes information. Partnering with Recognized Diabetes Education Programs ensures that the latest standards of care for diabetes are incorporated into programs and educational offerings and that qualified staff is involved in the design and delivery of diabetes services.

Evaluation

Monitor the establishment of the Diabetes Network sites.

Objective 2:

Through the regional Diabetes Network sites, develop and deliver programs for improvement of nutrition, physical activity, weight and blood pressure control, and smoking cessation for children and adults at risk for diabetes and its complications.

Main Risk Factor Outcome Objectives by the year 2007:

Physical Activity: Increase levels of physical activity outside of regular work among Missourians:

- Reduce the proportion of adults who engage in no leisure-time physical activity from 28.8% (BRFSS 2000) to 27%.
- Reduce the proportion of adults with diabetes who engage in no leisure-time physical activity from 38.3% (BRFSS 2000) to 35.5%.
- Increase the proportion of adults who in a usual week do moderate physical activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening or anything else that causes small increases in breathing or heart rate from baseline (BRFSS 2001) by 5%.
- Increase the proportion of adult with diabetes who in a usual week do moderate physical activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening or anything else that causes small increases in breathing or heart rate from baseline (BRFSS 2001) by 5%.
- Increase the proportion of high school students who exercised or participated in physical activities for at least 20 minutes that made them sweat and breathe hard on three or more of the past seven days from 64.3% (YRBS 1999) to 66.3%.

Healthy Eating: Increase the proportion of Missourians eating a well-balanced nutritious diet:

- Increase the proportion of adults whose average daily intake of fruits and vegetables is five or more servings from 20.7% (BRFSS 2000) to 23%.
- Increase the proportion of adults with diabetes whose average daily intake of fruits and vegetables is five or more servings from 29.9% (BRFSS 2000) to 32%.
- Increase the proportion of high school students whose average daily intake of fruits and vegetables is five or more servings from 18.3% (YRBS 1999) to 20.2%.

Healthy Weight: Decrease the prevalence of overweight and obese individuals in the following groups:

- Adults who are overweight from 34.3% (BRFSS 2000 new guidelines) to 33.3%.
- Adults who are obese from 22.1% (BRFSS 2000 new guidelines) to 21.1%.
- Adults with diabetes who are overweight from 40.7% (BRFSS 2000 new guidelines) to 39.7%.
- Adults with diabetes who are obese from 40.3% (BRFSS 2000 new guidelines) to 39.3%.
- High school students who are overweight from 12.8% (YRBS 2001) to 12% by 2007.

High Blood Pressure: Increase the percent of adults having their blood pressure checked within the past year from 86.1% (BRFSS 1997) to 88% by 2007:

- Increase the percent of adults with diabetes having their blood pressure checked within the past year from 94% (BRFSS 1997) to 97% by 2007.

Smoking: Decrease the prevalence of smoking among Missourians:

- Decrease the adult smoking prevalence from 27.2% (BRFSS 2000) to 24.4%.
- Decrease the adults with diabetes smoking prevalence from 29.8% (BRFSS 2000) to 27.8%.
- Decrease the high school student smoking prevalence from 30.3% (YRBS 2001) to 27.8%.

Strategies

Health Systems

The regional Diabetes Network partners will:

- Partner with managed care organizations, hospitals, health care professionals, and other professional organizations to increase the number of persons who receive diabetes risk factor counseling/education.
- Partner with managed care, hospitals, federally qualified health centers, free health clinics, and local public health agencies to initiate diabetes risk factor counseling/education and control programs that can be implemented in a health setting as well as community settings.

Communities

The regional Diabetes Network partners will:

- Establish linkages through local school health services for the purpose of providing education, counseling, and resources to school personnel and families in Missouri's public and private schools.
- Establish linkages with Chronic Disease Lead Agencies and other local public health agencies to provide technical assistance to worksites, schools, and communities for the purposes of assessment and development of programs that increase awareness of diabetes and related chronic diseases, nutrition, physical activity, weight and blood pressure control, and smoking cessation for children and adults at risk for diabetes and its complications.

- Partner with Regional Arthritis Centers to provide physical activity and educational programs on chronic disease risk factors in local communities.

- Partner with the Division of Senior Services and Department of Social Services, Division of Family Services to provide chronic disease risk factor educational training to Breast and Cervical Cancer Outreach Coordinators.

- Identify and partner with agencies and community organizations, especially those that are faith-based, to target and reach at-risk populations and initiate nutrition and physical activity interventions

- Partner with school nurses to provide educational programs.

- Partner with Cardiovascular Health Program to perform assessments of the cost of diabetes at worksites in each region.

- Partner with the ADA and other organizations which focus on minority health to form and strengthen minority community groups with an interest in health and wellness.

- Partner with Diabetes Today coalitions to provide culturally specific diabetes related materials for education programs.

- Partner with Missouri Primary Care Association through the REACH 2010 grant in Kansas City to deliver prevention programs to minority populations.

- Use neighborhood newsletters and messaging systems to disseminate culturally specific diabetes related information in local communities.

Communication

The regional Diabetes Network partners will:

- Promote health communication messages that increase awareness of diabetes, including messages to health professionals, individuals with diabetes, the public, and policy makers.

Rationale

In Missouri, 7% of the population has diabetes and an estimated 52% of the population has at least one risk factor associated with the development of diabetes. The public needs to be made aware of the risk factors for diabetes and informed about how to reduce their risk for this disease.[9]

An increasing number of Missourians are becoming overweight and physically inactive. Proper nutrition and regular physical activity prevents many of the risk factors of diabetes, and Missouri residents should be educated as to these facts. Health education enhances the knowledge of the individual or group of people and aids in development of skills that are necessary to support behavior change.[5]

Type 2 diabetes, once considered a disease of adults over the age of 40, is now being found in increasing proportions among children. Children need to be educated on the importance of a healthy diet and adequate exercise early in life as obesity and physical inactivity are linked to Type 2 diabetes. Healthy behaviors started in childhood and adolescence may have tremendous benefits for future health and prevention of chronic disease.

Evaluation

- Measure the number of partnerships established.
- Measure the number of programs initiated through these partnerships.
- Measure the number of hospital programs that offer:

  -children's wellness programs,
  -diabetes education programs,
  -diabetes screenings,
  -blood pressure screenings,
  -wellness education programs,
  -fitness/exercise programs,
  -weight management programs, and
  -smoking cessation programs.

Monitor Missouri's BRFSS for physical activity, fruit and vegetable consumption, overweight and obesity, high blood pressure, and smoking.

Monitor Missouri's YRBS for physical activity, fruit and vegetable consumption, overweight and obesity, and smoking.

Monitor health communications, promotion, and outreach activities.

Objective 3:

Improve preventive practices and testing associated with the management and control of diabetes:

Foot Exam

The proportion of adults with diabetes who receive the recommended annual comprehensive foot exam will be increased from 63.1% (BRFSS 2000) to 75%.

Eye Exam

The proportion of adults with diabetes who receive the recommended annual dilated eye exam will be increased from 67.9% (BRFSS 2000) to 75%.

A_1c Test

The annual proportion of adults with diabetes who receive the recommended two or more A_1c tests per year will be increased from 69.7% (BRFSS 2000) to 75%.

Influenza Vaccination

The proportion of adults with diabetes who receive the recommended influenza vaccination will be increased from 57.6% (BRFSS 1999) to 75%.

Pneumonia Vaccination

The proportion of adults with diabetes who have ever received a pneumonia vaccination will be increased from 47.7% (BRFSS 1999) to 60%.

Blood Glucose Monitoring

The proportion of adults with diabetes who monitor their blood glucose one time or more per day will be increased from 51.3% (BRFSS 2000) to 53%.

Periodontal/Dental Exam

The proportion of adults with diabetes who have visited a dentist or dental clinic in the past year will be increased from 47.7% (BRFSS 1999) to 52%.

Strategies

Health Systems

The regional Diabetes Network partners will:

- Establish educational programs among primary care physicians, related specialists (such as ophthalmologists, optometrists, and dentists) and office staffs to increase percent of persons receiving recommended exams, tests, and immunizations annually.
- Partner with Missouri Patient Care Review Foundation to incorporate and promote diabetes quality improvement initiatives, including the Diabetes Collaborative.
- Partner with federally qualified health centers and Missouri Primary Care Association to increase the number of providers who participate in the Diabetes Collaborative, in order to increase the percentage of persons who receive recommended diabetes care.
- Partner with payers/purchaser groups to assure diabetes standards of care are provided to their employees through their health plans.

Communities

The regional Diabetes Network partners will:

- Partner with community organizations to provide educational programs related to diabetes control and complications.
- Utilize culturally appropriate educational materials.

Communication

The regional Diabetes Network partners will:

- Promote the flu and pneumonia immunization campaign by utilizing campaign materials, identifying partners, and collaborating with local public health agencies' immunization campaigns.

Rationale

Uncontrolled diabetes can lead to a number of serious complications. Studies have validated the efficacy and economic benefits of secondary prevention (i.e. control blood glucose, lipid, and blood pressure levels), and tertiary prevention (i.e. screening for early diabetes complications such as eye, foot, and kidney abnormalities), followed by appropriate treatment and prevention strategies. Persons with diabetes are two to four times more likely to die from cardiovascular disease than persons without diabetes. Studies have clearly indicated that secondary and tertiary prevention can reduce overall cardiac-related illness, disability and death.[14] It is essential to use strategies that would lessen the burden of this disease, resulting in lower prevalence of unnecessary illness, disability, death, and expense.[15]

Evaluation

- Track the number of professional and community educational programs offered.
- Compare baseline with 2007 BRFSS.
- Assess the diabetes registry data.

Objective 4:

Provide at least one professional education program with continuing education credits annually through each regional Diabetes Network partner.

Strategies

Health Systems

The regional Diabetes Network Partners will:

- Partner with academic institutions and professional organizations in the development and implementation of continuing education programs for health professionals in diabetes treatment, self-management, and care guidelines.
- Partner with academic institutions to ensure medical school curriculum addresses prevention of diabetes and latest clinical guidelines for standards of care.
- Partner with federally qualified health centers, free health care clinics, Missouri Primary Care Association and Missouri Patient Care Review Foundation to provide professional education that will incorporate culturally responsive clinical care in health care settings.

Rationale

As health professionals are the direct contact for people with diabetes, programs directed at these professionals provide the opportunity to promote standard clinical guidelines for care and best practices for treating those at risk for diabetes and people who have diabetes. The training of health care professionals in prevention and the latest standard of diabetes care is critical.

Evaluation

- Measure the number of diabetes education programs offered.
- Track number of professionals earning continuing education credits.
- Partnerships with academic institutions related to diabetes curricula.

Objective 5:

To support existing surveillance systems and identify gaps in collection and reporting of data related to diabetes.

Strategies

- Whenever possible, incorporate the diabetes and related modules into the annual BRFSS and other special surveys conducted by the Office of Surveillance, Research and Evaluation.
- Annual evaluation report that assesses progress on all State Plan strategies.
- Partner with managed care organizations to obtain data on diabetes-related services among managed care, Medicare, Medicaid, and other payers.

Rationale

Surveillance and data systems are important tools for monitoring progress towards set objectives. These evaluation measures are needed to gauge progress and this will also further direct MDCP efforts statewide.

Evaluation

- Identify and utilize data sources.
- Produce an annual evaluation report.

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